BULLETIN NO. 22. (B. A. I. 120.)

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY.

PROCEEDINGS

OF THE

SECOND ANNUAL MEETING

OF THE

ASSOCIATION

OF

EXPERIMENT STATION VETERINARIANS,

HELD AT

OMAHA, NEBRASKA,

September 8, 1897.

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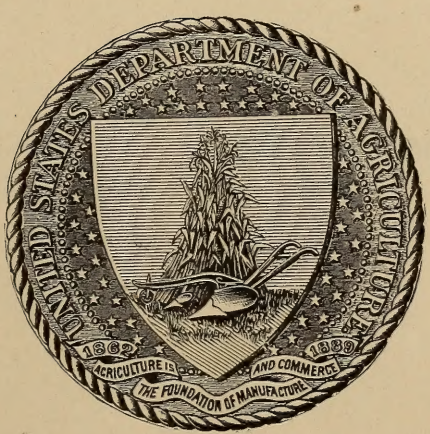

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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Animal Industry,
Washington, D. C., November 11, 1898.

Sir: I transmit herewith a record of the proceedings, with accompanying papers, of the Association of Experiment Station Veterinarians, held at Omaha, Nebr., on September 8, 1898, and recommend its publication as a bulletin of this Bureau.

The Association of Agricultural Colleges and Experiment Stations, the Association of Official Agricultural Chemists, and the entomologists of the experiment stations have been organized for several years, and their proceedings have been published by this Department. That rapid and beneficial progress has been the result of such cooperation is beyond question. The veterinarians recognize this fact, and a few who are especially interested have put forth efforts to effect a similar organization. It is believed that the nucleus already formed will grow into an organization which shall not only be of service to the several States, but be helpful as well to the General Government in cooperating, as necessity may arise, with the Bureau of Animal Industry.

Respectfully,

D. E. Salmon,
Chief of Bureau.

Hon. James Wilson,
Secretary.

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PROCEEDINGS OF THE SECOND ANNUAL MEETING OF THE ASSOCIATION OF EXPERIMENT STATION VETERINARIANS, 1898.

The Association of Experiment Station Veterinarians met in its second session in the Millard Hotel, Omaha, Nebr., on September 8, 1898. The following named members were present:

MEMBERS PRESENT.

J. W. Connaway, Missouri Agricultural College Experiment Station, at Columbia.

James Law, Cornell University Agricultural Experiment Station, at Ithaca, N. Y.

C. A. Cary, Agricultural Station of the Agricultural and Mechanical College of Alabama, at Auburn.

S. B. Nelson, Washington Agricultural Experiment Station, at Pullman.

A. T. Peters, Agricultural Experiment Station, at Lincoln, Nebr.

M. H. Reynolds, Agricultural Experiment Station at the University of Minnesota, at St. Anthony Park.

D. E. Salmon, Chief of the Bureau of Animal Industry, United States Department of Agriculture.

M. Stalker, Iowa Agricultural Experiment Station, Ames.

NEW MEMBERS.

New members were elected as follows:

S. S. Buckley, Maryland Agricultural Experiment Station, at College Park.

Paul Fischer, Kansas Agricultural Experiment Station, at Manhattan.

W. C. Langdon, North Dakota Agricultural Experiment Station, at Agricultural College.

F. L. Russell, Maine Agricultural Experiment Station, Orono.

NEW OFFICERS.

Officers for the ensuing year were elected as follows:

President, James Law.

Vice-President, J. W. Connaway.

Secretary-Treasurer, A. T. Peters.

Executive committee: M. Stalker, A. W. Bitting, and M. H. Reynolds.

The Secretary, reporting for the past year, expressed gratification at the work done by the association. There was more cooperation among the stations than heretofore, and good feeling prevailed.

Changes among the veterinarians of the various stations were noted, as follows: N. S. Mayo, who resigned from the Kansas Experiment Station, is now with the station at Storrs, Conn. The position at Storrs was vacated by G. A. Waterman, who is now with the station at Lansing, Mich. A. A. Grange resigned from the Michigan station and is now connected with the Detroit College of Medicine in its veterinary department. The position vacated by S. B. Staples at Baton Rouge, La., is now occupied by W. H. Dalrymple. Paul Fischer is now located with the station at Manhattan, Kans. W. B. Niles resigned from the Iowa Agricultural College, at Ames, and J. A. Craig has been selected as his successor.

Papers read before the association follow herewith.

GROWING TUBERCLE BACILLI FOR TUBERCULIN.

By C. A. Cary, B. S., D. V. M.,
Veterinarian, Agricultural Experiment Station, Auburn, Alabama.

It is not the purpose of this article to project new ideas or discoveries, but rather to make a few suggestions.

In order to make tuberculin one must first secure a pure culture of tubercle bacilli. This may be done by procuring a pure culture from some one who has it, or by isolating the bacilli from a tuberculous animal or man. The latter method should be adopted, because the former leads to lazy habits and inexperience. Secure some fresh tuberculous sputum; wash some of its solid or albuminous particles through six to ten changes of sterilized distilled water; inject one or more of these particles into the peritoneal sac of a guinea pig, a rabbit, or a house mouse. In three or four weeks and before the animal dies of the disease, kill it and from the spleen and liver carefully inoculate several of the ordinary blood serum tubes and of Löffler's blood serum mixture tubes. Keep these tubes in the incubator at 37.5° C., and in twenty to thirty days the characteristic pure-culture growth will be observed in some of the tubes. Other tubes may exhibit no growth, and still others may show growths of other germs.

A large stock of neutral glycerin bouillon should be kept on hand. It is best to make this bouillon from veal or with beef from an animal less than one year old. However, the most essential thing in preparing this bouillon is that it should be neutral in reaction. This is most accurately secured by titrating a 0.4 per cent solution of sodium hydrate into 10 cc. of the bouillon to which has been added a drop of an alcholic solution of phenolphthalein. The 10 cc. of bouillon

should be taken from the bouillon mixture after it has been heated and the coagulated albuminous materials have been removed by filtration. Then the delicate rose color, which indicates the neutral stage will be readily observed. After making the calculation, neutralize the acidity in the bouillon by adding the proper quantity of an 8 per cent solution of sodium hydrate. After neutralizing, the bouillon should be cooked and filtered again. This method was first used by Schulz, and is described in full by Abbott in his "Principles of Bacteriology."

After the bouillon has been neutralized and sterilized, put it into large, flat-bottomed Erlenmeyer or antitoxine flasks, sterilize again, and then inoculate with tubercle bacilli. Some authorities recommend floating a small quantity of the dry bacilli from an old agar-agar culture upon the surface of the bouillon, but this is very difficult. I find that it is just as efficient to take upon the platinum wire some of a moist growth of the tubercle bacilli and rub them over the inside surface of the flask on a level with the top or upper surface of the bouillon. It is best and easiest to inoculate a small Erlenmeyer flask of bouillon as suggested above; and when a thin film has formed over the surface, small pieces of the film may be lifted out with a hooked platinum wire and they will readily float upon a bouillon surface.

After the cultures have grown at a temperature of 37.5° C. for six or eight weeks, heat in steam sterilizer for 15 minutes; run through sterilized filter paper; then pass it through a Pasteur-Chamberlain air pressure filter or any good filter that will remove all of the germs. The filtrate may be evaporated on a water bath to one-tenth of its original volume, and the result will be the strong, or concentrated, form of tuberculin Kochii. This form keeps better or longer than any other. One-half to 1 per cent of carbolic acid may be added to the filtrate and the tuberculin will keep for some time. It will have the regular strength, and be ready for use without requiring any changes. To the filtrate may be added an equal quantity of pure glycerin; this will preserve it by preventing the growth of accidental infection, but will make it one-half as strong as the normal, or regular, tuberculin. This last method has not been tried sufficiently to warrant the writer in recommending it in preference to the well-tried methods.

FEEDING WILD PLANTS TO SHEEP.

By S. B. Nelson, D. V. M.,
Professor of Veterinary Sciences, Washington Agricultural College and School of Science.

For many years past there have occurred in the State of Washington, when sheep were being moved from winter quarters to summer pastures, serious losses in the flocks. According to the statements of the various sheep owners these losses have occurred in certain definite localities in the spring, but not in the autumn, when the sheep were returned to their winter feeding quarters. These fatalities happening under apparently the same conditions—at the same time and place each year—led the sheep owners to believe that the deaths were due to eating some grass or weed which acted as a poison to the sheep. This condition was brought to the attention of the Experiment Station and certain members commenced the work of investigating the cause of the great mortality in the flocks. As these experiments are not completed, it is not the intention of this paper to discuss the cause of the death of the sheep, but to record the results of feeding to sheep different plants, many of which have been and are considered poisonous to sheep and other domesticated animals.

The station botanist went into these various localities and ascertained what plants were there. About thirty-five different plants were observed, and as many as possible of these were fed and the results noted. The plants found were grouped into two classes: First, those from which might be expected a positive result; second, those from which a negative result might be looked for—judgment on both classes being based on public opinion about many of the plants; and also consideration being given to the abundance with which the plants were distributed. Following is the list of plants collected:

Class 1.—*Delphinium menziesii*, *Castilleja pallescens*, *Crepis barbigera*, *Astragalus dorycnioides*, *Astragalus spaldingii*, *Astragalus palousensis*, *Zygadenus venenosus*, *Frasera albicaulis*, *Antenaria luzuloides*, *Sisyrinchium grandiflorum*, *Arnica fulgens*.

Class 2.—*Saxifraga integufolia*, *Lupinus ornatus*, *Leptotænia multifida*, *Peucedanum grayii*, *Synthyris rubra*, *Clematis douglassii*, *Heuchera glabella*, *Lithospermum pilosum*, Geranium, Potentilla, *Eriogonum heracleoides*, *Geum triflorum*, *Grindelia nana*, *Chœnactis douglasii*.

DELPHINIUM MENZIESII.

The first, and which was thought the most important, was *Delphinium menziesii*. Three sheep were used in this experiment. Prior to the experiment they had been kept in a lot where there was running water and were fed timothy hay.

Experiment No. 1.—May 17: At 4:30 p. m., sheep No. 1, a ewe, was tethered in a patch where Delphinium was very plentiful. She was returned to the stable at 8:30 p. m. There was evidence that she had eaten the blossoms of a few Delphinium. The next day she was placed in the patch at 5 a. m. and returned to the stable at 8 p. m. Besides the plants that she had cropped, there was given to her about 1 pound of gathered Delphinium plants, which she ate. On May 19 she was again tethered in the patch and given, in addition to the amount she obtained there, 1 pound of Delphinium. This was repeated on May 20; but she had only one-half pound of the gathered plant. She had, however, eaten everything within her reach except some scattered plants of *Brodiæ douglasii*. The following day she was staked out in a fresh place. She once in a while bit off the heads of the Delphinium, but did not seem to prefer it; however, by the evening she had eaten all the green material within the reach of her tether except the *Brodiæ douglasii*. May 22: She was tethered in a fresh place at 5:30 a. m., and by 9 a. m. she had eaten all the grass and Delphinium within her reach. On the 23d and 24th she was all right. Here we have an experiment in which a sheep is kept tethered in a patch of Delphinium for six days, and she ate all of the plant that she could obtain and was fed 2½ pounds besides, with a negative result.

Experiment No. 2.—This sheep was placed in a small pen, and on May 18 was given 5 pounds of Delphinium, consisting of stems, leaves, flowers, and unripe pods. May 19: He had eaten all that was given him yesterday. May 20: At noon he was given 2½ pounds of Delphinium that was gathered on the 18th. Probably considerable of the plant's water had evaporated; how much, I do not know. In 2½ hours he had eaten nearly all of it, and at this time was fed 5 pounds that had just been picked. The next day he had eaten all that had been given him the day before. He was given 3 pounds that was partially dried. It had been picked 24 hours. Four hours later he had eaten the 3 pounds and was then given 7 pounds just gathered. May 22: Removed 1¼ pounds that he had not eaten. He was given 3½ pounds 24 hours old. The next day it was all eaten. May 24 and 25: He was well and the experiment was ended.

This sheep was fed, in 5 days, 24¾ pounds of Delphinium, of which 15¾ pounds were freshly gathered, 6½ pounds 24 hours old, and 2½ pounds 48 hours old. All this with a negative result. Certainly

this was more of the plant than a sheep would possibly gather on the range in the same length of time. During these 5 days he had nothing else to eat, subsisting wholly on Delphinium.

Experiment No. 3.—This was intended as a check on experiment No. 2; but this sheep did not eat the plant so readily. It consumed during the 5 days only 6¼ pounds. The result, however, was also negative.

These experiments certainly are strong evidence that *Delphinium menziesii*, at least when eaten fresh at this time of the year, is not poisonous to sheep.

CASTILLEJA PALLESCENS.

This plant was looked upon with distrust as being poisonous, for the reason that it occurs only in a few places in the State in abundance, and these places were where the sheep often died. Two sheep were used in this experiment, which began May 26. Fed to the first 1¾ pounds of Castilleja. The next day it was observed that he had eaten only a little, but he was given, in addition, the same amount as before. May 26: Only a little eaten. May 29: Nearly all eaten. May 30: All was consumed. In 4 days he ate 1½ pounds of the plant. On May 30, the second sheep was fed 2 ounces of Castilleja, which he ate immediately.

The results of both of these experiments were negative.

CREPIS BARBIGERA.

We were informed by a party very much interested in this matter that years ago he had seen *Crepis barbigera* fed to sheep with fatal results. I therefore looked for positive results from these trials. Two sheep were used.

May 26: There were fed to the first one 2 ounces of Crepis. The next day he had not eaten all of it. May 28: It was all eaten and he was given one-half pound, which was eaten by the following day. June 23: The second sheep was fed 1¾ pounds of *Crepis barbigera*, which he ate as if he relished it.

Nothing detrimental to the sheep resulted from either experiment.

THE ASTRAGALI.

These plants have at various times been suspicioned of causing trouble in our domestic animals. We used the three following species: *Astraglus spaldingii*, *A. palousensis*, *A. dorycnioides*. Of *Astragalus dorycnioides*, 5½ ounces were fed May 26. Of *A. spaldingii*, 12 ounces were fed June 3, and again to the same sheep were given 1¼ pounds on June 8, five days later. June 9: 2½ pounds of *A. palousensis* were fed to the third sheep. These sheep

ate the various amounts given them during the night following without any ill effects resulting. Could these experiments have been continued for a longer period of time, it may be that pathological changes would have followed the continuous feeding.

ZYGADENUS VENENOSUS.

This plant is called "poison camas" by the Indians, and it is reported that the eating of the bulb has caused death in the human family. On May 31, June 1 and 2, a sheep was fed 1½ ounces daily. He would eat them from the hand with apparent relish. However, his appetite was kept sharpened so that he would eat almost anything. June 4: Fed to this sheep 1 pound of the plant, both in blossom and in fruit. This amount was all eaten during the night. The sheep remained well.

FRASERA ALBICAULIS.

This beautiful plant was next tried on one sheep. June 3: He was fed 1½ pounds, which he ate before next morning. June 5: Fed to him 5 pounds, of which he ate about one-half during the night. By the 8th he had eaten nearly all. On this day he was fed three-fourths pound more, which was 4 days old. He ate this last amount during the night. In all he received 7¼ pounds without any apparent injury.

SISYRINCHIUM GRANDIFLORUM.

The plants of this species that were fed were 4 years old and about 20 of these stalks were fed. The sheep ate them out of the hand. Result, negative.

ANTENARIA LUZULOIDES.

Three pounds were gathered and fed to one sheep. It was all eaten in less than 24 hours, without any visible bad results.

ARNICA FULGENS.

This was the last plant in this class to be used. Fed to a sheep 2 pounds of the plant that had been gathered 18 hours. The material was all eaten during the day. Results, entirely negative.

This closed the experiments with those plants from which we had some reason to obtain some clearly visible physiological effects. There was fed of the different plants from one-eighth to 7 pounds in one day.

In the second class the following were fed and eaten in about 6 hours' time: *Saxifraga integufolia*, 7 ounces; *Leptotænia multifida* 1¾ pounds; *Grindelia nana*, 2 pounds; *Chænactis douglassi*, 1⅓ pounds. No poisonous symptoms followed.

LUPINUS.

On May 30, there was fed to a sheep 1¼ pounds at 11 a. m.; at 6 p. m. it was all consumed. The next day he was given 2½ more pounds, which he ate greedily. June 1: That amount was doubled, giving him 5 pounds; this he consumed by the next day. This sheep was fed 8¼ pounds in a few hours less than three days. No untoward effects resulted.

PEUCEDANUM GRAYII.

On May 31 I fed 1⅞ pounds of this stinking plant, having much doubt that the sheep would eat it. The following morning it had, however, all disappeared. Two days later he was fed at one time 4 pounds, which he ate by the following morning. The sheep showed no ill effects from it.

The following five plants were fed to five different sheep: *Clematis douglasii*, 4 pounds; *Lithospermum pilosum*, 4 pounds; Geranium, 3½ pounds; Potentilla, 4 pounds; and *Eriogonum heracleoides*, 3½ pounds. Each sheep ate his allowance in less time than one day and showed no ill effects whatever from it.

Of the next three plants, a smaller amount was given: *Synthyris rubra*, 1 pound; *Heuchera glabella*, 1½ pounds; and *Geum triflorum*, three-fourths pound. The sheep took nearly 24 hours to eat this, and the result again was negative.

In these experiments from three-fourths to 4 pounds of the various plants were fed in one day without appreciable effect on the sheep.

In conclusion, I wish to acknowledge the valuable advice and assistance of the station botanist, C. V. Piper, in carrying on these experiments.

THE EXPERIMENT STATION VETERINARIAN AS A MEMBER OF THE STATE BOARD OF HEALTH.

By M. H. Reynolds, D. V. M., M. D.,
Veterinarian, Agricultural Experiment Station of the University of Minnesota.

It is unfortunate that there is not greater uniformity in methods of controlling infectious diseases among domestic animals. Some States have adopted the plan of a State veterinarian, assisted by local deputies, the State veterinarian having little or no connection with the State board of health, while other States are trying to control infectious diseases among domestic animals through boards of live stock commissioners. Some States have a State veterinarian working on very meagre salary, and other States have State veterinarians who are nongraduates and who are given considerable authority. And still other States are trying to control these diseases by means of official titles; that is, they have officers and titles, but these offi-

cers are practically without funds and without sufficient authority.

In Minnesota all police authority concerning infectious diseases of animals is vested in the State board of health. Until January 1, 1897, this board was composed exclusively of physicians. For a great many years Minnesota's State board of health presented the strange combination of a board composed exclusively of practitioners of human medicine, having absolute authority concerning infectious diseases of domestic animals. During this time the gentleman who held the position of Experiment Station veterinarian was expected to visit outbreaks and accomplish marvelous things in the way of checking infectious diseases without any authority. This situation and the results of this method did not prove satisfactary to our stock interests. Stockmen made such vigorous objections during the winter and spring of 1896 and 1897 that the governor decided to appoint a veterinarian to membership on the State board of health. After due consideration he appointed the Experiment Station veterinarian. This is the present situation in our State. Possibly another veterinarian may be appointed to membership on the board in the future, and then the work will be divided more nearly as it should be.

Our newly appointed member of the State board of health was soon made chairman of the committee on infectious diseases of animals and given immediate charge of the correspondence and general office work pertaining to that work. After about six months of this work, he was made director of a newly created veterinary department. This divided the work of the board into three parts—that of the secretary and general executive officer, the bacteriological laboratory in charge of a director (and, by the way, we have a laboratory and bacteriologist in connection with this work in Minnesota, of which we are proud), and the veterinary department. Rules which partly define the duties and authority of the Director of the Veterinary Department have been adopted as follows:

RULES CONCERNING WORK IN THE VETERINARY DEPARTMENT.

1. The Director of the Veterinary Department shall have the privilege of proposing such circulars and rules as he may deem necessary for the purpose of defining the policy of the board with reference to the veterinary work of the board. Such circulars and rules shall be submitted to the executive committee or to the State board of health for approval.

2. The Director shall conduct the correspondence dealing exclusively with veterinary matters. He shall have the necessary police authority to enable him to order quarantine when in his judgment such course shall become necessary. He shall have authority to use his judgment in releasing quarantine in unusual cases, independent of the rules governing quarantine.

3. All agents and employees doing veterinary work in the field shall report to the Director, and it shall be the duty of the Director to furnish the Secretary with such summaries of regular work and with such other information as the Secretary may need.

4. It shall be the duty of the Director to refer such matters as violation of the law dealing with infectious diseases of animals, general enforcement of said law, and indifference and carelessness of local health officers, to the Secretary for action.

5. It shall be the duty of the field veterinarian to investigate outbreaks of infectious diseases among domestic animals, when deemed advisable by the Director of the Veterinary Department, and to attend to such experimental and other veterinary work as may seem necessary. When not doing field work, it shall be his duty to assist the Director in correspondence and other office work.

6. The field veterinarian shall have authority to order quarantine, to kill and release quarantine of domestic animals, in accordance with the rules and recognized methods of the State board of health.

7. It is hereby declared the policy of the State board to pay the salary and furnish transportations for the field veterinarian. Local boards are expected to pay all his other legitimate expenses incurred in work for them.

The work of the Veterinary Department has grown rapidly in all directions. During the last year we employed one field veterinarian. This spring we added another. Thus, you see, we have one veterinarian as a member of the State board of health and two others engaged in the field work of the board. One of these field veterinarians devotes his entire time to hog cholera; the other does miscellaneous work, going to outbreaks of any disease of unusual importance, to outbreaks where there is dispute among different veterinarians who have been called by owners and local boards, and to places in the State where there are no competent veterinarians.

Perhaps I should explain that in Minnesota we expect the local board to employ in ordinary cases a local veterinarian and take care of their own outbreaks of infectious diseases among domestic animals under the direction, of course, of the State board. The law requires that local health officers shall report to the State board of health within 24 hours after receiving information of an infectious disease.

During the four years of my work as an Experiment Station veterinarian before my connection with the State board of health, I was constantly crippled for lack of police authority. An Experiment Station veterinarian is usually expected to visit outbreaks, make diagnoses, and write prescriptions, and then he is severely blamed because the outbreak of glanders or anthrax, or possibly sheep scab, does not promptly abate. During this time I could give such information and advice, and write such prescriptions, but had no authority to insist on anything. If I did this kind of work for the State board of health, the Station received no credit.

On the other hand, the State board of health veterinarian or State veterinarian, as the case may be, who has no connection with an Experiment Station, is very apt to be crippled for lack of opportunities and funds for investigation. For instance, he visits an outbreak

of disease that affords a very peculiar and unusual history. The trouble may be due to faulty conditions of the feed, but he is unable to make a careful investigation and gather satisfactory information as to the cause and nature of the trouble, perhaps for lack of funds for such work.

An Experiment Station veterinarian, who is also a State board of health veterinarian or State veterinarian, has splendid opportunities for collecting material, for doing a great variety of experimental work and keeping accurate records with very little expense to the station. He can collect an abundance of material for almost any sort of experimental work, almost without expense to the station. This is especially true if he has access to a well-furnished bacteriological laboratory.

Another advantage is that such an arrangement brings about a hearty cooperation between two great institutions which might otherwise be working separately and more or less fruitlessly in the same field, each one's work incomplete without the data which the other could furnish. By the way, I might suggest that in Minnesota this plan of cooperation, especially in matters of agricultural interest, is in quite general and happy operation. For instance, our State University, including our Agricultural College and School of Agriculture, our Experiment Station, and State Farmers' Institutes, are all intimately associated in their work, partly because the regents of the University and Experiment Station are influential members on the Board of Control of the State Farmers' Institutes. Our State Fair Grounds adjoin the Experimental Farm; and there is the closest possible cooperation between the State Agricultural Society, Minnesota Stock-Breeders' Association and the Experiment Station with its congeners, the College and School of Agriculture and the State Farmers' Institutes. The Experiment Station veterinarian is also director of the veterinary department of the State board of health.

We find cooperation between the veterinary work of the Experiment Station and the State board of health to be very satisfactory. We found the work unsatisfactory before such combination was made. So long as we had one authority in the State who had charge of infectious diseases, and another who worked in both parts of this field but had no police authority over infectious diseases, the work for each outbreak was more or less tangled.

Owing to the way in which the work is organized in Minnesota, outbreaks of infectious diseases among domestic animals are discovered and reported by the local health officer to the State board. If the outbreak is such that it can be taken care of by the local health officer or by a representative of the State board of health, and all that is needed is a little police authority, it does not necessarily involve the station work at all. On the other hand, if it is work that

invites investigation, the Experiment Station furnishes materials and means for such work, and finally, if it is thought best, publishes and distributes the results of such investigations.

If representatives of the State board of health and Experiment Station go into the legislature together and ask for an appropriation or modification of existing laws, they are apt to be successful.

Correspondence and other office work of the veterinary departments of the two institutions can be greatly economized by cooperation. There is needed only one set of office records and one official head for the two departments. Although there may be a large correspondence and an immense amount of office records and files to look after, the work can be so planned that one office assistant does this work for both. In our State the Experiment Station permits me to use a portion of my time for the State board of health work on the ground that I would have to do a great deal of this work whether connected with the State board of health or not. The office assistant and stenographer does all my correspondence and keeps Station records, although her salary is paid by the State board of health.

By this cooperation we avoid a great deal of duplicating, which would otherwise be unavoidable. For instance, I write a small bulletin on hog cholera and swine plague for the Experiment Station; after it has been distributed by the Experiment Station, I condense it into a small circular for use in the State board of health work.

Let me say, in conclusion, that I hope that the work of this association will aid in bringing about greater uniformity and closer cooperation between our various States; and when this work is organized as it should be every State will have one or more veterinarians on the State board of health, and the Station veterinarian will be ex officio a member of that board.

LABORATORY RECORDS FOR VETERINARIANS.

By A. W. Bitting, D. V. M.,

Veterinarian, Agricultural Experiment Station of Indiana.

One of the first essentials in research work is the adoption of some system of keeping records. It matters little what system is used if it possesses the merit of convenience and clearness in giving the information desired. Some stations have a common method of reporting for all departments. Some utilize blank forms, which are filled out each day and filed. Others keep the records in books of uniform style, while a few have no fixed method, but trust to reporting each experiment by itself.

A method which commends itself to those who have used it is the card-index system, because of its adaptability to so many kinds of reports. It is the only convenient system that can be employed in keeping a bibliography of the special subjects under investigation. It requires but a few hours to catalogue all the articles in the veterinary journals each month and probably only a few minutes to index the special articles relating to the subjects under study. I undertook the task of making a complete index of all the English periodical veterinary literature. The journals indexed are The Veterinarian, The Veterinary Journal, The Edinburg Veterinary Review, The Veterinary Record, The American Veterinary Review, The Journal of Comparative Medicine, The Veterinary Magazine, and the Journal of Veterinary Science in India. The number of cards now in the index is over 50,000, and it will require about 12,000 more to bring the work up to the close of 1898. While this index is of great convenience and value, I could not recommend anyone to attempt to duplicate it, as the work is several times greater than is anticipated. If a few stations need such an index, it would be far more convenient to have a printed copy made from this one than to duplicate the work. I believe, in general, it will be found to be profitable to index only special subjects, although all will admit the use and desirability of having a complete index. In making a bibliographical index the same style should be used as followed by public libraries.

The card index is the most convenient form of recording the presence and distribution of diseases in the State. The card should give the name of the disease, the locality, the time when reported, and the name of the person reporting it. The cards may be filed according to the disease reported or by counties to give the distribution.

The index is one of the best means for keeping a record of the equipment of the laboratory. The card should give the name of the article, of whom and when purchased, and the cost. When the article is broken or consumed the card may be removed and an inventory is always at hand. For recording staining reagents it should give the formula and date of preparation of each.

A card index serves as a convenient method of keeping certain laboratory notes. Examinations are frequently made of material out of the usual line of work and a brief record is all that is needed. Such a record upon a card may be filed and become useful at some future date when the subject is under consideration. Reports of cases may be filed in the same way. So far as possible it is best to use the large index cards, and for recording laboratory examinations or cases cards of usual height but double length.

THE DESIRABILITY OF COOPERATION BETWEEN THE STATION VETERINARIAN AND THE LOCAL VETERINARIANS IN THE STATE.

By A. W. Bitting, D. V. M.,
Veterinarian, Agricultural Experiment Station of Indiana.

It may be possible to imagine an experiment station so well equipped and so liberally provided with funds that the veterinarian at the head of his department can use his discretion in the selection of the disease or the special problem for investigation; that he may go wherever the disease is present, stay as long as may be necessary to make a complete series of observations, or repeat his visitations until he has learned all that he can. In such a position he could be independent of public demands, and could utilize all his energy in prosecuting his work.

A veterinarian occupying a position in a State experiment station is confronted with a difficult set of conditions. The funds for maintaining this department are limited. He is usually compelled to make his studies upon outbreaks of disease and such sporadic cases as occur in the immediate vicinity of the station. If he visits localities at some distance from the station he is rarely permitted to have all the time that is necessary to complete the work or repeat his visitations because of exhaustion of the funds. Under the conditions existing at most of the stations the veterinarian can have at best only a small number of cases of any disease upon which to make observations or experiments. The public demands that he should be informed concerning the occurrence and distribution of contagious diseases, and in many instances that he shall give assistance in their suppression. Of all the members of the station staff he is the least independent. He can not order an outbreak of disease for his special study; he can not control the location or duration of the disease when one does occur; and he can obtain information upon the occurrence and distribution of contagious diseases in the State only through correspondence.

I believe the veterinary department of the experiment station and the veterinarians in the State should be on such friendly terms that cooperative work may be conducted to the advantage of both. The station can act as a medium to give the latest information upon the results of its own researches and announce the work that is being accomplished at other places. The station may also give assistance in diagnosis in certain cases where the microscope or other special equipment is necessary. The veterinarian, in turn, may be of great assistance to the station by reporting outbreaks of disease and the results of any experiments which he may undertake.

In 1896 and 1897 I made an attempt to determine whether cooperation was practical and whether the station would gain information to compensate for the work required. There were ninety-six qualified veterinarians in the State. A circular letter setting forth the plans and blanks for reporting the number of cases occurring in their practice each month were sent to each veterinarian. The list of diseases upon which reports were desired were those most common in the State. It included abortion (infectious) among mares and cows, actinomycosis, anthrax, cholera, glanders, influenza, rabies, specific ophthalmia among cattle, sporadic aphthæ, tetanus, tuberculosis, azoturia, colic, other intestinal diseases, parturient apoplexy, periodic ophthalmia, pneumonia, cerebro-spinal meningitis, bursatte, fistulæ, lameness, etc. At first I received about thirty-five replies, but the number gradually became smaller until only eight remained after the month of August. In 1897 I tried a different plan, and made my blank upon a postal card and distributed them at the end of each month. I sent the postal cards to about twenty-five addresses and had fifteen reports for each month of the year. At the close of the year there was much greater interest than at the beginning, and I feel certain that I could have doubled the number of correspondents. The work was abandoned, as I contemplated withdrawing from station work.

The time covered by this work is admittedly too short to draw conclusions from the reports, but they seem to indicate that certain diseases, such as tetanus and parturient apoplexy, are of far more common occurrence than is generally suspected; that certain diseases, such as fistulæ and bursatte, are common in some localities and rare in others; and that seasonal influences are less marked than is often asserted. The station received fifty-one species of parasites for identification and also a number of pathological specimens. At the suggestion of the writer several new preparations were used and reports received. The station supplied its own publications and gave notice of all bulletins upon veterinary science as they appeared at other stations and the Bureau of Animal Industry. Upon the whole the station was well repaid for its part of the work, and the veterinarians expressed the desire to have it continued.

One of the good effects that was wholly foreign to the original object was the increased interest which it developed in the State Veterinary Medical Society. At the first three meetings of the society which I attended, only seven or eight members were present. The three meetings held after the correspondence was established was attended by from twenty to thirty members.

THE EXHIBIT OF THE UNITED STATES EXPERIMENT STATION VETERINARIANS AT THE PARIS EXPOSITION IN 1900.

By A. T. Peters, D. V. M.,
Investigator of Animal Diseases, Agricultural Experiment Station of Nebraska.

I take pleasure in presenting a subject which ought to be of vital interest to every member of this association, namely, the veterinary exhibit of the United States Experiment Stations at the Paris Exposition in 1900. As is well known, at the convention of the Association of Agricultural Colleges and Experiment Stations, held in July, 1897, at Minneapolis, a committee upon a collective exhibit of the experiment stations at the Paris Exposition in 1900 was appointed, consisting of H. P. Armsby, M. A. Scovell, W. H. Jordan, A. W. Harris, and A. C. True. The committee has had a meeting in conference with Hon. James Wilson, Secretary of Agriculture, and the executive committee of the above association. As yet no appropriation has been made by Congress for such an exhibit, but the committee, as a result of their meeting, have seen fit to proceed with the preliminary arrangements. Mr. Armsby has written me regarding the exhibit of the Veterinary Department, and I have consented to bring the matter before this body for its careful consideration.

Mr. Armsby writes that "the committee desires to make in this exhibit a presentation of the origin, history, and work of the stations which shall be calculated to illustrate the essential and distinguishing features of the American system of experiment stations as compared with those of other countries. With this end in view, it is proposed to make the exhibit technical rather than popular in its nature, appealing to the expert and the administrator rather than to the farmer. In carrying out this plan, it is the intention to make use of two methods: First, it is intended to prepare a report which shall include a characterization of the work of the experiment stations along four main lines, namely: (a) Police and control work; (b) studies of natural resources and conditions; (c) demonstration on experiments; (d) scientific investigations. Second, based upon this report, it is desired also to make as attractive an exhibit as practicable of selected typical examples of experimental methods and results."

I have given this matter no little study, and the more thought I spend upon it the more perplexing becomes the question as to how we veterinarians can best show to the Old Country our unique way of investigating scientific problems. I believe this question can be settled right here at the meeting of experiment station veterinarians. And hence I have thought it advisable to offer this paper merely as an introduction to the discussion which I know you will enter into

heartily. The committee desires not "a complete and exhaustive report upon our work, nor a complete bibliography, but a characterization of the main lines and tendencies of our work, classified under the headings given above."

Concerning police and control work may be mentioned the work done by the experiment station veterinarians in aiding the Bureau of Animal Industry in formulating the best methods of controlling contagious diseases by quarantine regulations, sanitary measures, and vaccination. In this work what greater triumph have our foreign brethren scored than we have scored in preventing the spread of Texas fever to the Northern States by the quarantine laws, and in successfully eradicating pleuro-pneumonia in the United States; which latter fact will always be a source of great wonderment to foreign veterinarians, and which it will take scores of years for them to accomplish? Too much can not be said in regard to our work in eradicating sheep scab by the enforcement of sanitary measures and quarantine rules, when we consider how easy it is for it to spread unless the strictest laws are observed. Another thing that is characteristic of American veterinarians is the work done by the different States in controlling tuberculosis and glanders by the extensive use of tuberculin and mallein and the destruction of the diseased animals.

In demonstrating our experiments we shall be able to show that they are original and unique. Though not all have been successful, yet it must be admitted that a great per cent have been successful; in fact, a much larger per cent than is publicly known. And even those that have failed have in a way been stepping stones to higher scientific investigations. The veterinarians abroad who are unfamiliar with what we have done, and who have given us credit for so little, can, if we take advantage of this opportunity, be shown that our work ranks as high as theirs. This latter fact has never been conceded by them, but we must remember that the investigations and experiments of our veterinarians do not date back so far as do those of European investigators, and hence it becomes our opportunity to illustrate to them that our work of recent years compares surprisingly favorable with theirs. Personally, I believe that along certain lines our investigations even exceed those of our foreign brethren. To back this up I should like to call attention to American investigations in Texas fever as compared with the German investigations in Wildseuche and Büffelseuche, which are supposed to be the same as Texas fever.

Besides these researches, which have resulted in the discovery of the real cause of Texas fever, the movements of the little tick, and the best method of treatment and prevention, let me call attention to the work of the Bureau of Animal Industry and the experiment

stations in investigating hog cholera. In this country this investigation is undoubtedly foremost. As much as this may be said concerning actinomycosis and many other diseases too numerous to mention here.

I have pointed out to you only a few of the many distinguishing features that go toward characterizing the work of the United States experiment station veterinarians, and I am therefore in hopes that these few words of introduction will aid in bringing out from the members statements of just how and what we ought to exhibit before our foreign veterinarians.

The idea of the committee is to demonstrate in the report the characteristic investigations along the lines of the various diseases for which each station is noted. This should be prepared in a technical, concise manner, yet simple and practical enough to prove that no nation on earth has done more along these lines in recent years than has the United States agricultural experiment stations. For instance, this report should contain an outline of the work done, together with the results in the separate States, including police and control work, and laboratory and field investigations and experiments. The exhibit accompanying said report should consist of apparatus, specimens, statistics, and all materials used, thus making the report more practical and illustrative than otherwise.

To make such a showing possible, and in order to do justice to the United States experiment stations, it will require your entire cooperation in the matter; and allow me, in closing, to express the hope that you will each and every one enter heartily in assisting the committee to gather the material necessary to make the venture a success.

THE VALUE TO VETERINARIANS OF COOPERATIVE EXPERIMENTS.

By L. L. Lewis, M. S., D. V. M.,
Veterinarian, Oklahoma Agricultural Station.

As new as the Association of Experiment Station Veterinarians is, the subject of cooperative experiments is still newer so far as the station veterinarian is concerned. It is not to be expected that with so recent an organization there should be any definite understanding in regard to cooperative work, but to my mind there is no one thing more necessary to the advancement of the veterinarian's work than an organization of those interested in experimental work. Cooperative experiments will follow as a natural consequence of such an organization, but it is not the intention or province of this paper to favor any one plan of work, but rather to try to mention some of its advantages, hoping that sufficient interest will be taken in the subject to bring it before the next meeting in the form of a suitable discussion.

The station veterinarian's work is almost the only line of station work that is not to a certain extent cooperating with other stations for the purpose of securing more complete data on certain lines of work. The other departments of the station are getting better results by cooperative work, not only with other experiment stations, but also with the Department of Agriculture. The veterinarian should not be less ready to exchange views and ideas with his fellow worker than men engaged in other lines of work, and the more liberal is this exchange the surer of success.

I think there is no work better suited to such organization than the work of the veterinarian. The pathology and therapeutics of most of the contagious and infectious diseases can be as successfully studied in one part of the country as another, and by an exchange of data on the work, following a general plan or outline, some definite results will be secured in very much less time than by the present method where everyone works independently, repeating the mistakes of others and duplicating, it may be, a large amount of work. More data of a reliable nature could be secured in one year on any given subject by the cooperation of several stations than are now available in from two to five years.

It is not probable that very many of the stations will do very much work of this character in the immediate future. There has been some work of this character in the past two years and, so far as the writer knows, it is a satisfactory method of conducting experiments.

Where assistance can be given without interfering with the general plan of work it should be done if such a proposition be made. But the idea of cooperative work should not mean the sacrificing of one's ideas of method and manner of work; if it did, it certainly would be a failure.

A portion of the station veterinarian's time is occupied by teaching, as most of them are members of the teaching staff in the agricultural colleges. A large part of his time may be occupied by work conducted in the laboratory or routine in character, but aside from this work there is time to devote to field experiments or to laboratory work of a cooperative character.

I realize that a more able writer and a more experienced station worker should have been assigned to this duty, but I trust that by the time the next meeting is held there may be more stations interested in the work, as I believe that cooperation will increase the usefulness of the veterinarian's work in a scientific as well as a practical way.

HISTORY OF THE ASSOCIATION.

The Association of Experiment Station Veterinarians is an outgrowth from the correspondence that sprung up in 1896 among various Experiment Station veterinarians who saw the necessity of such an organization. As a result of this correspondence, circular letters were sent out to all veterinarians of the United States Experiment Stations and Agricultural Colleges asking them as to the advisability of such a movement, and informing them that an attempt would be made to organize temporarily at the Buffalo meeting of the United States Veterinary Medical Association. In February, 1897, another circular letter was addressed to the same men stating that a temporary organization had been formed, in accordance with the plans, by Doctors Salmon, Stalker, Reynolds, Grange, Cary, Williams, Pearson, and Peters. It was the unanimous opinion of these gentlemen that an association of this character would be of great benefit to the station veterinarian. Accordingly, at the Nashville meeting of the United States Veterinary Medical Association in 1897, a permanent organization was effected, papers were read, permanent officers were elected, and a constitution and by-laws adopted.

The second annual meeting, the proceedings of which are herewith published, was held at Omaha with the United States Veterinary Medical Association on September 8, 1898.

CONSTITUTION AND BY-LAWS OF THE ASSOCIATION OF EXPERIMENT STATION VETERINARIANS.

CONSTITUTION.

Article I.—Name.

This Association shall be known as the Association of Experiment Station Veterinarians.

Article II.—Object.

The object of this Association is to bring the several veterinarians of the different Experiment Stations in a closer communication, to advance their common interests by the establishment of honorable and fraternal relations, and to secure the benefits of cooperation and united action in bringing into prominence the merits of scientific veterinary investigation.

Article III.—Members.

All those who are connected with the U. S. Experiment Stations and Agricultural and Mechanical Art Colleges may, upon application and the payment of the initiatory fee, become members of this Association.

Article IV.—Officers.

Chapter 1. The officers of this Association shall consist of a President, Vice-President, Secretary-Treasurer, and three Trustees, who shall constitute the Executive Committee.

Chapter 2. The officers shall be elected for one year by ballot and hold office until their successors are elected.

Article V.—The Executive Committee.

The Executive Committee shall manage the business of the Association under such regulations and restrictions as the Association may from time to time prescribe.

BY-LAWS.

SECTION I.

Article 1. The President shall preside over the meetings of the Association.

Article 2. He shall deliver an address at the annual meeting succeeding his election.

Article 3. He shall appoint all committees not otherwise provided for.

SECTION II.

Article 1. The Secretary shall give due notice of the time and place of each annual meeting. He shall conduct all correspondence of the Association, retain copies, and report the same at each meeting.

Article 2. The Secretary shall also perform such other duties as may be imposed upon him by the Association.

SECTION III.

Article 1. The Secretary-Treasurer shall collect all bills due the Association and give security for all moneys held by him if desired. He shall keep a correct account of the same, holding receipts for all disbursements. He shall furnish a statement of the funds of the Association at each annual meeting, or oftener if desired.

Article 2. He shall be the custodian of all moneys belonging to the Association, or donations, and keep a correct account of the same with the names of the donors, and report such members as have failed to pay their dues for one year.

Article 3. The Treasurer shall pay out no money from the treasury, or dispose of any money or property of the Association, without the knowledge and approval of the President. All bills audited by the Finance Committee shall be paid by the Treasurer upon the order of the President.

SECTION IV.

Article 1. Order of business:

Roll call.
Reading of minutes of previous meeting.
President's address.
Reports of committees.
Admission of new members.
Unfinished business.
New business.
Election of officers.
Miscellaneous business.
Papers and discussions.

Section V.

Article 1. Seven members shall constitute a quorum for the transaction of business at the annual meeting.

Section VI.

Article 1. The annual dues shall be one dollar ($1.00) and the secretary is instructed to levy a tax upon the members sufficient to cover any deficit that may occur.

Section VII.

Article 1. Any proposed alterations or amendments to the constitution or by-laws shall be submitted in writing to each member of the Association at least three months before the next annual meeting.